REMARKS

Claims 1-21 are pending in the application. Claims 1-11 have been withdrawn. New claims 22 and 23 have been added. Support for claims 22 and 23 and the amendments to the specification are found in Fig. 1. The Examiner's consideration and allowance of claims 12-23 are respectfully requested.

Applicants hereby submit a Declaration Under 37 CFR § 1.132. The Declaration is a statement by one knowledgeable in the art of the field of the invention that a person skilled in the art would not have looked to the Iannicelli or Gardner references cited by the Examiner for teachings as to the present invention, and that the present invention is not obvious over their teachings.

The Examiner has rejected claims 12, 13 and 18-21 under 35 U.S.C. § 103(a) for obviousness over U.S. Patent No. 3,637,490 to Gardner et al. (hereinafter "Gardner") in view of U.S. Patent No. 3,224,582 to Iannicelli et al. (hereinafter "Iannicelli"). The Examiner asserts that Gardner discloses a system for fluid clarification substantially as claimed in the present application, but lacking a buoyant media recovery unit in fluid communication with the flotation chamber and the flocculation chamber. The Examiner asserts that Iannicelli discloses the use of an accessory particle or buoyant media recovery unit to aid in reusing the accessory particles, and that it would have been obvious to one skilled in the art to combine the system of Gardner with a buoyant media recovery unit in view of the teachings of Iannicelli.

However, one skilled in the art is not led to combine the teachings of Gardner and Iannicelli. The standard for combining references in an obviousness determination is that the prior art must contain a teaching, motivation, or suggestion to make the specific combination that was made by the applicant. *In re Sang-Su Lee*, 277 F.3d 1338, 1343, 61 USPQ2d (BNA) 1430, 1433 (Fed. Cir. 2002). The prior art contains none of these.

Gardner and Iannicelli teach devices for carrying out two distinct processes. Iannicelli teaches a device for the separation of clay particles on the basis of their surface properties, and the resulting differences in adhesion to the surfaces of collector particles. Iannicelli describes this separation as "a particularly delicate differential separation of desirable from undesirable fractions in clay", see col. 2, lines 8-9. Iannicelli refers at length (col. 1, line 35 – col. 2, line 10) to the choice of accessory particles so as to have characteristics that render them readily separable from the finely divided materials. Gardner, in contrast, teaches a method for the removal of waste solids from industrial and municipal waste waters. In the Gardner process, the solid material resulting from the separation is waste, and is unlikely to have a homogeneous composition. Consequently, one skilled in the art would view the flotation agent of Gardner as more difficult to separate from waste solids than the collector particles of Iannicelli would be to separate from clay. This view is confirmed (col. 2, lines 59-61) in Gardner, where it is stated that incineration would be a suitable process for regenerating the flotation agent. Incineration is an energy-intensive process; its suggested use implies that less strenuous regeneration processes would not produce acceptable results. The motive of adding the accessory particle or buoyant media recovery unit of Iannicelli to the Gardner system is therefore missing, because one skilled in the art would not expect it to be effective in the Gardner system.

One of skill in the art would be motivated to combine the Gardner and Iannicelli references if there were an indication that solid waste, once combined with collector particles or a flotation agent, could be removed readily by gravity separation in water to regenerate the collector particles or flotation agent. Iannicelli teaches the use of gravity separation in water for collector particles, but only in a delicate differential separation. Gardner indicates that removal of solid waste from a flotation agent requires strenuous conditions. There is no teaching or suggestion of a combination of the aqueous gravity separation of Iannicelli with the Gardner process, and the motivation to combine the processes, in the expectation that the combination

would be effective in separating solid waste from collector particles or flotation agent or for any other reason, is absent.

In addition, various aspects of the Iannicelli process suggest that its teachings are incompatible with the Gardner process. The two processes have different goals. The Iannicelli process separates two solids. The Gardner process separates a solid from a liquid. Therefore, the processes have different products, and one skilled in the art would expect that different techniques would be used. Specifically, Iannicelli teaches the addition of petroleum products to the substances to be separated (col. 3, lines 14-17). In both the waste water treatment process of Gardner and the clarification system of the present invention, the quality of the water produced is a measure of the effectiveness of the process. This is not the case with the Iannicelli process. A waste water treatment process yielding water that contains oil is not an effective treatment process. In other water clarification processes, such as the process of the present invention as used for the processing of potable water, the addition of oil is expressly forbidden.

In addition, Gardner makes use of a flocculant; the Iannicelli process does not. The Gardner flocculant is a material added to the process stream to collect all solids present from water. One skilled in the art would therefore expect that separation of solids from the combination of flocculant and flotation agent taught by Gardner would be more difficult than the separation of solids and flotation agent, without flocculant, taught by Iannicelli. Furthermore, compounds of iron, commonly used as flocculants, are the color impurities that are removed by the Iannicelli process. Iannicelli refers to a dark color crude at col. 3, line 75 (0.78% Fe_2O_3, col. 4, line 9); and to a light color crude at col. 4, line 31 (0.34% Fe_2O_3 at col. 4, line 37). A process for removing a substance (as in Iannicelli) does not suggest the use of that substance as a removal agent (as in the present invention). Again, the person skilled in the art would not be provided with motivation to add a component of the Iannicelli process to the Gardner process.

Further, the combination of Gardner and Iannicelli does not produce the system of the present invention. Both Gardner and Iannicelli rely on a solids collection port or device in the bottom of the flotation chamber. Gardner makes use of a collector belt with paddles (Fig. 1, Fig. 2); Iannicelli makes use of a port at the bottom of the flotation machine for the removal of pulp body (Figure). In the present invention, no provision is made for the removal of solids from the bottom portion of the flotation chamber; the invention relies on the unanticipated ability of the buoyant media to provide flotation to essentially all the solids present in the flotation chamber. New claim 22 makes this distinction explicit to expedite prosecution.

For these reasons, it is believed that the rejection of claims 12, 13 and 18-21 for obviousness over Gardner in view of Iannicelli has been overcome.

The Examiner has rejected claims 14-16 under 35 U.S.C. § 103(a) for purported obviousness over Gardner in view of Iannicelli, and further in view of U.S. Patent No. 4,156,648 to Kuepper. The Examiner asserts that the claims differ from the Gardner and Iannicelli references by reciting that the flotation chamber contains lamella plates, tubes, or a specific baffle. The Examiner asserts that Kuepper discloses the use of a flotation chamber including lamella plates, baffles, and vertical plates that appear to form tubes. The Examiner also asserts that it would have been obvious to one skilled in the art to modify the teachings of Gardner and Iannicelli to include lamella plates, tubes, or baffles. However, Kuepper does not remedy the deficiencies previously described in the combined teachings of Gardner and Iannicelli. None of Gardner, Iannicelli and Kuepper teaches or suggests the combination of regeneration of collector particles or flotation agent in water with a method for flotation of solids from waste waters. For these reasons, the rejection of claims 14-16 for obviousness over Gardner in view of Iannicelli, and further in view of Kuepper, is believed to have been overcome.

The Examiner has rejected claim 17 under 35 U.S.C. § 103(a) for purported obviousness over Gardner in view of Iannicelli, and further in view of Kuepper. The Examiner

asserts that the claim differs from the Gardner and Iannicelli references by reciting that the flotation chamber contains immersed membranes. The Examiner asserts that U.S. Patent No. 5,728,304 to Yeh discloses the use of immersed screens or membranes in a flotation chamber to minimize turbulence, and that it would have been obvious to one skilled in the art to modify the teachings of Gardner and Iannicelli to include immersed membranes in the flotation chamber. However, Yeh does not remedy the deficiencies previously described in the combined teachings of Gardner and Iannicelli. None of Gardner, Iannicelli and Yeh teaches or suggests the combination of regeneration of collector particles or flotation agent in water with a method for flotation of solids from waste waters. For these reasons, the rejection of claim 17 for obviousness over Gardner in view of Iannicelli, and further in view of Yeh, is believed to have been overcome.

New claims 22 and 23, which depend from and add further limitations to claim 12, are deemed allowable for the same reasons set forth above regarding claims 12-21.

In view of the above remarks, it is believed that the claims are in condition for allowance. Reconsideration and allowance of claims 12-23 are respectfully requested.

Respectfully submitted,

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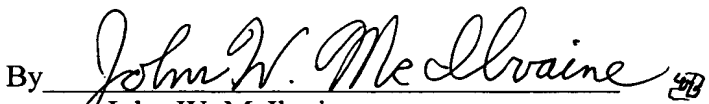
By 

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MARKED-UP VERSION OF THE SPECIFICATION

The fluid mixture, containing coagulants, flocculants, buoyant media, and the solids to be separated, then passes through a flotation chamber feed line 24, into a flotation chamber 30. Flotation chamber 30 is configured so that entering fluid is directed upward, expediting the flotation process. A baffle 32 is an example of a structure directing entering fluid upward. The action of the buoyant media, in conjunction with the coagulant and flocculant, [result] results in the formation of a thick sludge layer 34 at the top of flotation chamber 30. The lower region of the flotation chamber contains no outlet or mechanism for the removal of solids; all solids removed from flotation chamber 30 are removed from the upper region of flotation chamber 30. The sludge layer 34 is separated from the flotation chamber 30 into a sludge hopper 36. The separation can be effected by a chain-and-flight or reciprocating skimmer or other sludge removal device. Sludge can also be removed from the chamber 30 by hydraulic desludging. The removal of sludge, coagulant, and flocculant is effected from the upper region of flotation chamber 30. A clarified fluid 38 is formed by the removal of coagulant and flocculant from the entering fluid by the buoyant media. Optionally, a flotation assistance device 40 can be used to further hasten the flow of separated particles and buoyant media upward. Flotation assistance device 40 may be a dissolved air flotation (DAF) system or DAF pump, or dispersed air system or blower. The output from flotation assistance device 40 enters flotation chamber 30 through a flotation assistance line 42.